2023

ALS DEPLOYMENT PLAN

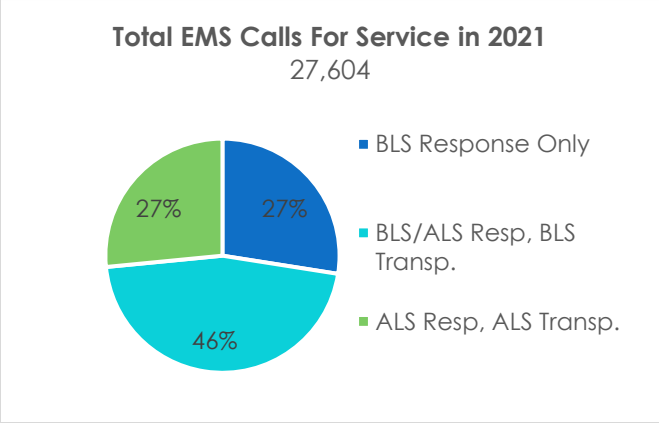
Battalion Chief Michael Cole

BACKGROUND

The Frederick County Division of Fire and Rescue Services (DFRS) operates a two-tiered response system to address medical-related calls for service. The base of these two tiers are the basic life support (BLS) ambulances, which do not carry advanced life support (ALS) equipment and are staffed by two personnel at the minimum provider level of Emergency Medical Technician (EMT). The second tier is the ALS Chase Car, which is staffed by an ALS clinician, and carries the necessary equipment to provide ALS-level interventions and care. In Frederick County, this unit is referred to as a "Medic Unit", and it responds in conjunction with a BLS ambulance when ALS interventions are indicated, as identified either through the 9-1-1 call-taking process, or when requested by responding BLS clinicians.

On medical calls for service that require an ALS level of care, both an ambulance and medic unit will respond. DFRS operates a total of eight (8) Medic Units, staffed by a single ALS clinician, and two (2) EMS Supervisors units, which provide round-the-clock coverage. Additionally, Frederick County receives mutual aid assistance from out-of-county units, which may be closer to certain residents who live within the county.

During calendar year 2021, DFRS responded to a total of 35,634 calls for service. 89% of the total calls for service resulted in an ambulance being dispatched, and 77.0% were for a response that was medical in nature. Of those medical calls, 20,017 were dispatched with both ALS and BLS resources, and of those, 7,326 calls were transported to hospitals at the ALS level.



Over multiple years the call volume for the current ALS units have increased exponentially, pushing the number of responses for some of the units past 4000 per year. At these volumes, the risk of provider fatigue increases, as does the potential for patient care-related protocol deviations. In June 2022, DFRS developed an EMS Planning Committee to review the current ALS deployment plan and identify ways to enhance the plan, with an emphasis on reducing call volume per unit through improvements to the ALS distribution and response throughout the County.

SUMMARY

This report outlines the recommendations of the EMS Planning Committee, and how the department can tailor its response to current call volumes by changing traditional response models, strategically adding new medic units to existing fire stations, and converting designated fire engines to paramedic fire engines. This will enhance the utilization of medic units by equally distributing call volume amongst all ALS units throughout the county, and ultimately allow for improved staffing.

These strategic goals include:

- Ensure individual medic unit call volumes remain below 3,000 calls annually.
- Ensure ALS response times are under 12 minutes to at least 90% of the population, at least 90% of the time.
- Simultaneously increase ALS availability by increasing staffing on fire engines from three to four personnel.
- Utilize the ALS clinicians' skills and knowledge in appropriate positions.

PROJECT APPROACH AND DATA

The EMS Planning Committee was comprised of 6 ALS clinicians from different ranks within the Division, with oversight provided by EMS Battalion Chief Michael Cole. The committee members include:

Captain Scott Gordon	Lieutenant Jake Harne
Fire/Medic Brian Jenkins	Fire/Medic Jason Porterfield

Lieutenant Cameron Pressman

The committee used the DFRS TUDE report system to retrospectively analyze the previous three years of response data. County-wide Emergency Service Zone (ESZ) areas were also analyzed to evaluate current deployment efficiency and utilization of resources.

ANALYSIS OF CURRENT SERVICE DELIVERY

The committee started by evaluating the current ALS service delivery model in regards to the four goals listed above along with looking at the current number of ALS clinicians within the Division and how they are currently being utilized.

CURRENT STAFFING

As of December 2022, the Division employs 80 paramedics operating throughout all ranks, including:

1 - ALS Fire Chief

1 - ALS Assistant Chief

6 - ALS Battalion Chief

5 - ALS Captains

15 - ALS Lieutenant

7 - ALS Technician

45- ALS Firefighter

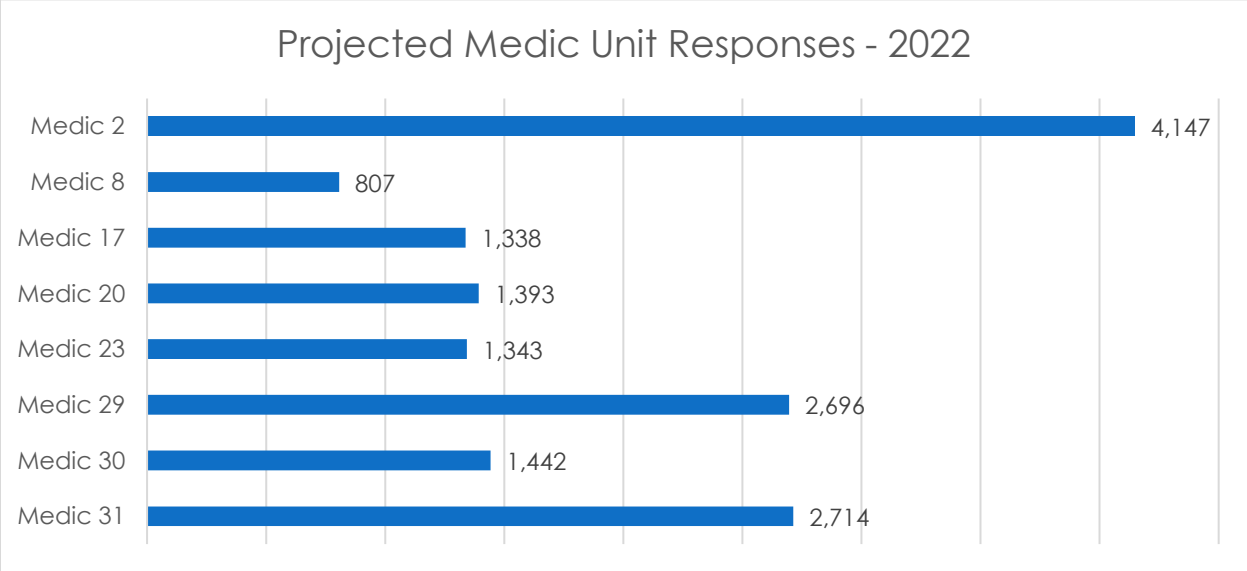
From the list above, 43 paramedics are assigned to one of the existing eight medic units. The Division's goal is to rotate the ALS clinician's riding position between the medic unit, or an "ALS Day", and the other apparatus staffed at that station, a "Station Day". This is achieved by assigning two clinicians to each station that houses an ALS unit but is predicated by adequate staffing within the Division. The result of this model is approximately half of the ALS clinicians working each day being utilized in a capacity other than that of an ALS clinician. Additionally, two of the paramedics who are ALS Firefighters staff the Division's Mobile Community Healthcare (MCH) Program, while the remainder of the ALS clinicians listed above hold a position of rank, with specific duties and responsibilities aside from the provision of primary ALS response.

CURRENT ALS UNITS AND PROJECTED CALL VOLUME

The committee collected and reviewed data for each unit over multiple years to include call volume. One piece of data that was analyzed was the number of ALS responses that occur across Frederick County, delineated by the Primary ALS Service Area. The Primary ALS Service Area is representative of the geographical area where a given medic unit is the first due ALS resource. This area includes all the ESZ's for the station to which that unit is assigned, as well as additional ESZ's where they are the closest ALS resource. The numbers in the table below reflect the projected number of responses in each of the primary ALS Service areas, based on the total number of responses by all the medic units.

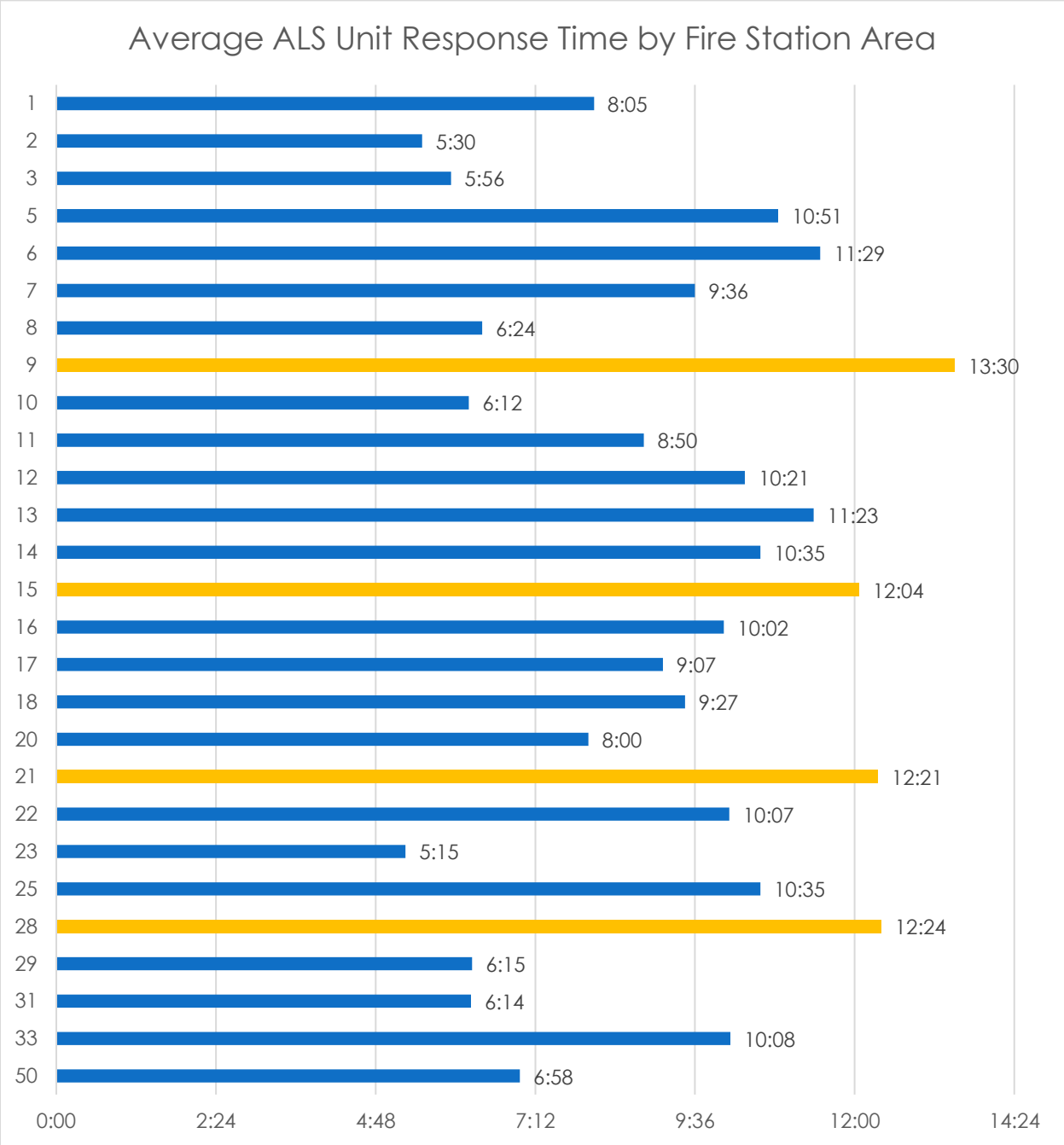
Primary ALS Service Area	Projected Call Volume in each Primary ALS Service Area
Primary ALS Service Area for Medic 2	5,309
Primary ALS Service Area for Medic 31	1,930
Primary ALS Service Area for Medic 29	2,338
Primary ALS Service Area for Medic 17	787
Primary ALS Service Area for Medic 30	1,246
Primary ALS Service Area for Medic 20	1,511
Primary ALS Service Area for Medic 8	452
Primary ALS Service Area for Medic 23	1,050

The Division currently staffs eight (8) Medic units. These units are geographically located to ensure the best ALS coverage for the County. In June 2022, Medic 1 was moved to Medic 29. With the transfer of that unit, the EMS Office started collecting and analyzing data weekly to review the call volumes for each medic unit and to determine projected annual response volume for each unit. The graph below represents these projections.



ALS RESPONSE TIMES

The committee reviewed data from 2020 and 2021 using the DFRS TUDE system to determine the average time for ALS response to each of the fire station areas. From this data, it was determined that responses to certain areas within the County were not able to meet the goal of having an ALS unit arrive on scene within 12 minutes. The graph below shows the average response time for an ALS unit to the ESZ's in each fire station area for CY21.



Gold indicates average responses greater than 12 minutes.

SAFER GRANT

IN 2022, DFRS was awarded $8,565,686 from the federal Staffing for Adequate Fire and Emergency Response (SAFER) grant. One of the requested funding options included in the grant provided for the increased staffing from three (3) personnel to (4) personnel on seven (7) fire engines throughout the County. The ALS Planning committee, with input from the Fire Chief, determined that by utilizing ALS clinicians for the added position on each engine, the Division can simultaneously increase fire engine staffing and ALS coverage across the county.

PROPOSED ALS DELIVERY PLAN

Through extensive collection and analysis of current response data, the EMS committee has determined that the plan proposed below will enhance the Division's efficiency by increasing the availability of ALS services to the areas with high call volumes. The plan will also assist in decreasing the number of areas within the County that are not currently meeting the goal of a twelve (12) minute response times for ALS. The proposed plan is broken down into 5 phases, with each phase detailing a description of the service delivery model, along with requirements to effectively initiate the model.

PHASE 1	**ACTIONS**
	➢ **Medic 4** - Chase Car – Peak time 0800 to 1800 hours
	REQUIREMENTS
	➢ **Staffing** - This unit will be staffed by volunteer providers or career providers as OT. The unit will not create holdovers/recalls. ➢ **Equipment** - Current equipment available ➢ **Vehicle** – Current Medic 100 vehicle

PHASE 2	**ACTIONS**
	➢ **Medic Engine 2 –** Transport ALS Provider ➢ **Medic Engine 31 –** Transport ALS Provider
	REQUIREMENTS
	➢ **Staffing** – These units will be staffed with the second provider currently assigned at Station 2 and 31. Recommended (**48**) operational ALS providers available and (**6**) additional BLS providers in the system. ➢ **Equipment** – Current equipment available ➢ **Vehicle** – Current Staffed engines - Engine 22, Engine 311

PHASE 3	**ACTIONS**
	➢ **Medic 4** - Chase Car – Transition to career providers, 24 hours a day, 7 days a week. Second ALS provider will staff Truck 4-to-4-person staffing.
	REQUIREMENTS
	➢ **Staffing** - This unit will be staffed by volunteer providers or career providers as OT. The unit will not create holdovers/recalls. Recommended (**57**) operational ALS providers available. ➢ **Equipment** – Must purchase full complement of ALS equipment through FY 24 budget. ➢ **Vehicle** – Current Medic 4 Vehicle

PHASE 4	ACTIONS
	➢ **Medic Engine 5 -** Transport ALS Provider ➢ **Medic Engine 10 -** Transport ALS Provider
	REQUIREMENTS
	➢ **Staffing** – These units will be staffed with the second provider currently assigned at Station 20 and 30. Recommended (**63**) operational ALS providers available and (**6**) additional BLS providers in the system. ➢ **Equipment** – Must purchase (2) full compliments of ALS equipment through FY 25 budget. ➢ **Vehicle** – Identified Engine currently at Station 5 and 10.

PHASE 5	ACTIONS
	➢ **Medic Engine 16 –** Transport ALS Provider ➢ **Medic Engine 25 –** Transport ALS Provider
	REQUIREMENTS
	➢ **Staffing** – These units will be staffed by new position ALS providers. The providers will staff the Medic engine every shift as the 4th provider. Recommended **(72)** operational ALS providers available. ➢ **Equipment** – Must purchase (2) full complement of ALS equipment through FY 26 budget. ➢ **Vehicle** – Identified Engine currently at Station 16 and 25.

JUSTIFICATIONS

Phase 1 -Peak Time Unit

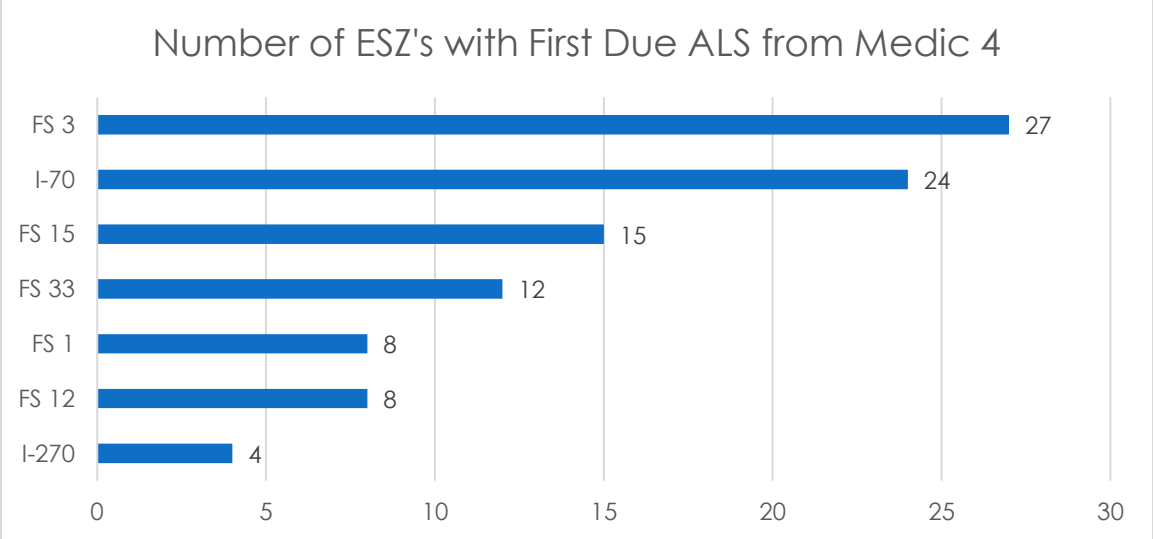
Phase 1 focuses on the implementation of a new medic unit designed to operate during peak service hours, with the goal of reducing the response burden on existing medic units in Frederick City. Located at Station 4, the unit will be staffed initially from 0800 to 1800 hrs. Expected benefits of this new unit include:

- Absolute reduction in call volumes for Medics 2, 29, and 31.
- Overall reduction in occurrences where a medic unit from outside of Frederick City is required to respond in to provide service
- Reduction of average response time by an ALS unit to the east and west sides of Frederick City.

Staffing for this unit will be provided by available ALS clinicians on an overtime basis. If no ALS clinicians are available, recalls and holdovers will not be used to staff the unit.

The map attached at the end of this document shows the 8 minute and 12 minute response coverage areas from Station 4.

PROJECTED CALL VOLUME	
MEDIC 4 -PEAK TIME	1,275



Phase 2- Medic-Engines Implementation

Phase 2 begins the two-fold process of increasing staffing levels on designated engines by adding an ALS clinician and equipment, which will effectively and concurrently establish the unit as a Medic-Engine. The first two units to receive this staffing will be at Stations 2 and 31. These stations were selected because they show the greatest potential for having the highest volume of ALS-type incidents generated within Frederick City and can capitalize on existing ALS clinicians already assigned to each station. Expected benefits of the additional Medic-Engines also includes:

- Increased ALS coverage in densely populated areas of Frederick
- Distribution of response volume across an increased number of ALS units
- Continued reduction in occurrences where a medic unit from outside of Frederick City is required to respond in to provide service
- Increased engine staffing increases the effectiveness of the engine company operations and meets the requirements set forth in the SAFER Grant.

PROJECTED CALL VOLUME	
Medic Engine 2	1,707
Medic Engine 31	1,035

Phase 3- Enhanced Coverage for Medic 4

With the implementation of Phase 3, the staffing for Medic 4 implemented in Phase 1 will transition from peak-hours only to a 24-7 rotation. This will be accomplished through the permanent assignment of two ALS clinicians per shift to the roster at Station 4 roster. The expected benefits of the implementation of Phase 3 include:

- Continued reduction in ALS call volume through added coverage hours
- Increased truck staffing increases the effectiveness of truck company operations and meets the requirements set forth in the SAFER Grant.

PROJECTED CALL VOLUME	
Medic 4	4,440

Phase 4- Additional Medic-Engine Placement in North and South Regions

Phase 4 will integrate two (2) additional Medic-Engines into the system, including units assigned to Stations 5 and 10. These locations were determined through a comprehensive analysis of response data from CAD. Coverage of large areas of the county at both the northern and southern ends by only a single ALS unit are one of the current limitations to the current deployment model and will be improved by the implementation of this phase. Additionally, the following benefits are expected from the implementation of Phase 4:

- Reduction in ALS response time for 2nd-due and greater responses in the area
- Increased engine staffing increases the effectiveness of engine company operations and meets the requirements set forth in the SAFER Grant

PROJECTED CALL VOLUME	
Medic Engine 5	652
Medic Engine 10	570

Phase 5 – Additional Medic-Engine Placement in Central and East Regions

Phase 5 will integrate an additional two (2) Medic-Engines into the system, including units assigned to Stations 16 and 25. Station 16's location is ideal, based on its ability to effectively cover a large section of the central portion of Frederick, while Station 25's location on the southeastern portion of the county reduces the need to depend on mutual aid units for coverage. Additionally, the following benefits are expected from the implementation of Phase 5:

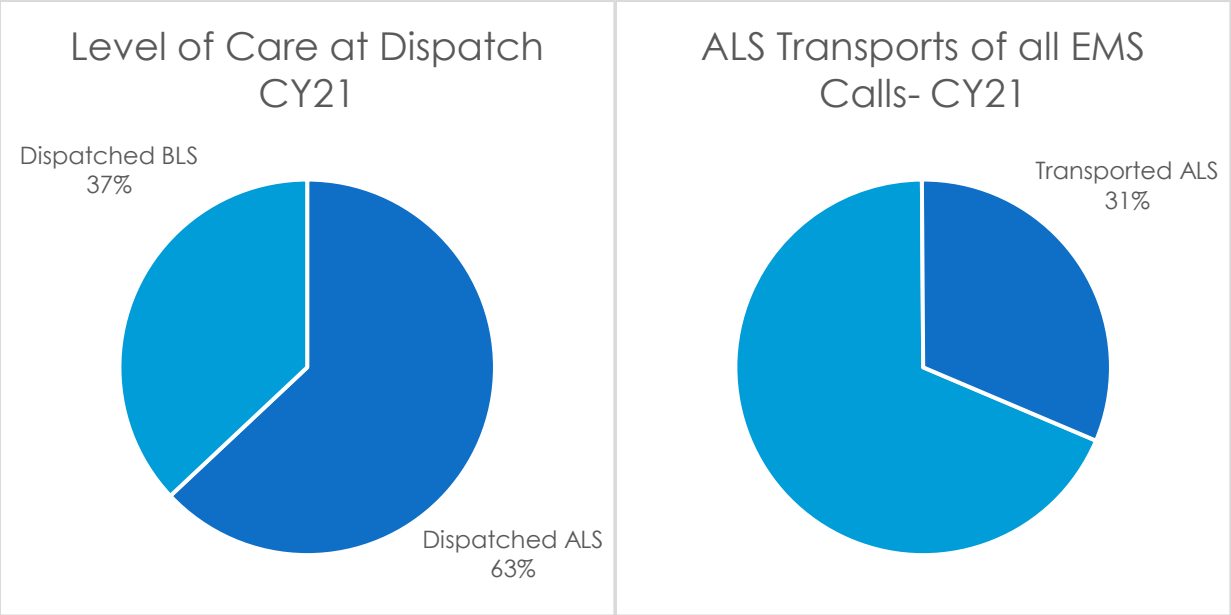
- Enhanced ALS coverage in designated regions
- Increased engine staffing increases the effectiveness of engine company operations and meets the requirements set forth in the SAFER Grant

PROJECTED CALL VOLUME	
Medic Engine 16	513
Medic Engine 25	876

Benefits of a Medic Engine vs. Medic Ambulance

Medic-Engines have the ability to benefit both the EMS system as a whole, as well as the safety of the individual clinicians who operate in it.

As shown below, current response data suggests that 63% of EMS calls annually are dispatched with an ALS unit, yet of those, only 31% are transported at the ALS level.



One significant limitation to a deployment plan that utilizes ALS ambulances is the total loss of a resource during transport, regardless of the level of care that is required for transport. Utilizing an ALS ambulance, the resource is unavailable for additional calls for service when transporting at the BLS level, as compared to an ALS chase unit, which has the ability to return to service without being confined to the transport itself. Additional benefits of staffing a Medic Engine include:

- Reduced time to ALS clinician arrival is associated with decreased morbidity and mortality with cardiac arrest.
- ALS clinicians acting as a 4th person on suppression crews are more efficient, completing essential tasks faster, and reducing injury from lifting and moving.
- Increased suppression staffing increases the effectiveness of the suppression company operations, and meets the requirements established by the SAFER Grant.

RESPONSE AREAS WITHIN 8-12 MINUTE MAPS

The EMS Planning Committee will evaluate the current plan on an annual basis and review the data to ensure the initial guidelines are being met. Future planning will also occur to review proper coverage and call volumes with future County development.